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CCBL: FD3-3957(T-77-2)
JPRS: R-3121-D

10 May 1963

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PAST. PSEUDOTUBERCULOSIS AND THE SALMONELLA GROUP

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Translated for:

U. S. CHEMICAL CORPS BIOLOGICAL LABORATORIES
Ft. Detrick, Md.

By:

U. S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES
JOINT PUBLICATIONS RESEARCH SERVICE
Building T-30
Ohio Drive & Independence Ave., S. W.
Washington 25, D. C.

THE DIAGNOSTIC IMPORTANCE OF THE ANTIGENIC CORRELATION BETWEEN
PAST. PSEUDOTUBERCULOSIS AND THE SALMONELLA GROUP

[Following is the translation of an article by Werner Knapp, a special reprint from Zentralblatt fur Bakteriologie, Parasitenkunde Infektionskrankheiten und Hygiene (Central publication for bacteriology, parasite studies, infectious diseases, and hygiene), I Orig. 164, Stuttgart, 1955, pages 57-59.]

In various articles we were able to report about Past. pseudotuberculosis as an irritant of mesenterial lymphadenitis which often occurs in adolescents with the clinical symptoms of acute appendicitis, and to point out the necessity of serological examinations to ensure the clinical and histological diagnosis.

Further studies of the occurrence of antibodies against Past. pseudotuberculosis in the serum of healthy and sick people revealed that frequently strains (which Thal had subordinated in the serological group IV and kindly given to us) became agglutinated through the serum of typhoid patients and of those who had been vaccinated for the prevention of typhoid, without the presence of a basis for a Past. pseudotuberculosis infection. In two children, who had been ill for some time, the agglutination of these Pasteurella strains lead to a serological suspected typhoid diagnosis which was later confirmed by the agglutination of *S. typhi* and the further clinical process. These observations lead to the question as to whether there is an antigenic correlation between Past. pseudotuberculosis and the Salmonella D group, and what consideration should be given to the correlation with the Salmonella B group, as described by Schutze, in the serodiagnosis of this Pasteurella infection.

Schutze's tests (1928) resulted in four different groups, I-IV, in their O-antigen, but not in the H-antigen. Thal reported (1954) five serological groups; of these only groups I, II, and III coincided with Schutze's. A comparison of his group IV and V strains and Schutze's only strain of group IV was impossible, since this strain no longer seems to be available either here or abroad. Since the group IV strains described by Thal differ in their O and H antigen from the representatives of the other groups, their identity with the strain of group IV as described by Schutze may be excluded.

As already mentioned, Schutze has reported on the antigenic correlation between Past. pseudotuberculosis of the serological group II and the Salmonella B group. Kaufmann found them given to factor IV, which led to the discovery of its complex nature IV₁ and IV₂. In 1954 Thal was able to report only on the antigenic relationship to the Salmonella B group. Pirosky's 1937 description of the antigenic correlation between the Pasteurella group and the Almonella D group was based on the

observation of two strains of *Pasteurella multocida*.

Through crosswise agglutination and absorption experiments in saturated and unsaturated O immune serum which was gained with strains of the *Salmonella* D group and of *Past. pseudotuberculosis* group IV, we tried to find proof of mutual antigenic relations. Chart 1 shows an example of these experiments, while chart 2 gives the agglutination results in saturated and unsaturated serum of patients with an unclear clinical diagnosis.

Chart 1

Crosswise reactions between *Past. pseudotuberculosis* Group IV and *Salmonella* Group D

Antigens	Antiserum			
	Unsaturated	Saturated		
Serum No 582 Past. <i>pstbc.</i> Strain 32 ^{IV} $2\frac{1}{2}$ hours 100°	Serum No 785 OD R-Instrm. (<i>Salm. gal-</i> <i>linarum</i>)	Serum No 582 saturated <i>S typhi</i> O (1bd)	Serum No 785 Saturated <i>Past. <i>pstbc.</i></i> Strain 32 ^{IV} 1bd	
Past. <i>pseudotuberculosis</i>				
Group I (St. 2)	---	---	---	---
Group II (St. 16)	----	---	----	----
Group III (St. 2200)	---	---	----	----
Group IV (St. 32)	1:1600	1:1600	1:1600	1:1600
Group V (St. 25)	---	---	----	----
S. <i>Typhi</i> O	1:800	1:800	----	1:200
S. <i>Typhi</i> Vi	----	----	----	----

Chart 2

Agglutination results in patients' serum with *Past. pseudotuberculosis* and *S. typhi* O

Pat. serum number	Suspected clinical diagnosis	Serum pre- examination	Agglutination of <u>Past. pseudo- tuberculosis</u>					<i>S. typhi</i> O
			Group					
			I	II	III	IV	V	
No 7517	without	- - -	-	-	-	1: 800	-	1:1600
Typhoid	sat. with <i>Past.</i> <i>pstbc. St. 32</i> ^{IV}	- - -	-	-	-	-	-	1: 400
	sat. with <i>S.</i> <i>typhi</i> O	- - -	-	-	-	-	-	-
No 7438	without	- - -	-	-	-	1:1600	-	1:3200
mesenterial	sat. with <i>Past.</i> <i>pstbc. St. 32</i> ^{IV}	- - -	-	-	-	-	-	1:1600
lymphadenitis	sat. with <i>S.</i> <i>typhi</i> O	- - -	-	-	-	-	-	-
No 6902	without	- - -	-	-	-	1: 400	-	1: 800
mesenterial	sat. with <i>Past.</i> <i>pstbc. St. 32</i> ^{IV}	- - -	-	-	-	-	-	1: 800
lymphadenitis	sat. with <i>S.</i> <i>typhi</i> O	- - -	-	-	-	-	-	-

These experiments prove the relationship (which, to the best of our knowledge, has not yet been described) between the O antigen in *Past. pseudotuberculosis* Group IV and the O antigen IX in the *Salmonella* D group. Furthermore, our experiments show that the *Pasteurella* strains of group IV do not possess the full IX antigen, so that the complex nature IX₁ and IX₂ applies to the IX antigen of the *Salmonella* D group as well.

From the point of view of practical serodiagnosis of mesenterial lymphadenitis which is caused by *Past. pseudotuberculosis*, our experiments (as previous observations made by Schutze) show that an agglutination of strains in group II and IV at the onset of a Widal reaction with strains of the serological groups I - V does not prove the presence of a *Pasteurella* infection. Positive results in the Widal reaction (the same applies to antigen analysis in the Gruber reaction) should be

evaluated only with a critical consideration of the antigenic correlation between *Past. pseudotuberculosis* and the *Salmonella* group. In doubtful cases, as shown in Chart 2, serum saturation should be used. In our experiments to date, it always led to a confirmation or proof of *Salmonella* infections, but never to the discovery of human infections with these strains. The question whether the clinical and histological picture of mesenteric lymphadenitis in humans is caused exclusively (as in our cases) by an infection with strains of *Past. pseudotuberculosis* serological group I, and whether serological reactions may be limited to strains of group I, can be answered satisfactorily only when we have more material on serologically and culturally positive cases (Note).

([Note:] Correction: In the meantime we have succeeded in culturing strains of *Past. pseudotuberculosis* group V, taken from the mesenteric lymphs of two adolescents who were operated on the suspicion of appendicitis. In another case, without having proved the irritant, we have made in infection with a strain of group II probable.)

Our observations, which have lead to a further discovery in the antigenic correlation between *Past. pseudotuberculosis* and the *Salmonella* group -- an important factor in serodiagnosis, show how important it is to prove the irritant in order to confirm the serological diagnosis and to send in undetermined gland and operation material.

Literature may be obtained from the author.

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